

CLAIMS

1. A measuring chip for separating and measuring a target component in a sample by rotation around each of a first axis and a second axis of rotation, the measuring chip comprising:

5 a centrifugal separation tube that centrifugally separates the target component from the sample by rotating the measuring chip around the first axis of rotation;

a first holding section provided in the bottom of the centrifugal separation tube, wherein non-target components in the sample are introduced into the first holding section by rotation around the first axis rotation, and the first holding section holds the non-target

10 components during rotation around the second axis of rotation; and

a measuring section connected to one end of the centrifugal separation tube, the measuring section measuring the target component introduced from the centrifugal separation tube by means of rotation around the second axis of rotation.

15 2. The measuring chip according to Claim 1, wherein the centrifugal separation tube is U-shaped.

3. The measuring chip according to Claim 1, wherein an opening of the U-shaped centrifugal separation tube is 90 degrees or less.

20 4. The measuring chip according to Claim 1, wherein the distance to the second axis of rotation becomes narrower as the tube extends to a second end from a first end of the centrifugal separation tube connected to the measuring section.

25 5. The measuring chip according to Claim 1, wherein the distance between a first end of the centrifugal separation tube connected to the measuring section and the first axis

of rotation is smaller than the distance between a second end of the centrifugal separation tube and the first axis of rotation.

6. The measuring chip according to Claim 1, wherein the first holding section has a holding section main unit, and a holding section connecting tube that connects the holding section main unit and a centrifugal separation tube; and the area of a cross-section of the holding section connecting tube is formed to be larger than the area of a cross-section of the centrifugal separation tube.

7. The measuring chip according to Claim 1, wherein the first holding section has a holding section main unit, and a holding section connecting tube that connects the holding section main unit and the centrifugal separation tube; and the holding section connecting tube is formed in a tubular shape, and an extension line of the tube axis of the holding section connecting tube intersects with the first axis of rotation.

8. The measuring chip according to Claim 1, wherein the first holding section has a holding section main unit, and a holding section connecting tube that connects the holding section main unit and the centrifugal separation tube; and the distance between the holding section main unit and the first axis of rotation is larger than the distance between the holding section connecting tube and the first axis of rotation, and the distance between the holding section main unit and the second axis of rotation is larger than the distance between the holding section connecting tube and the second axis of rotation.

9. The measuring chip according to Claim 7 or 8, wherein the depth of the holding section main unit becomes deeper as the holding section main unit separates from the

second axis of rotation.

10. The measuring chip according to Claim 7 or 8, wherein the area of a cross-section of the holding section main unit expands as the holding section main unit
5 separates from the second axis of rotation.

11. The measuring chip according to Claim 1, wherein the chip further comprises a second holding section provided in the bottom of the centrifugal separation tube, the non-target components are introduced into the second holding section by rotation around the
10 first axis of rotation, and the non-target components are held in the second holding section during rotation around the second axis of rotation.

12. The measuring chip according to Claim 1, wherein the centrifugal separation tube has a first tube extending to the bottom of the centrifugal separation tube from a first end
15 of the centrifugal separation tube connected to the measuring section, and a second tube extending from the bottom to a second end;

a bypass tube for connecting the first tube of the centrifugal separation tube to the second tube; and

a third holding section provided in the bypass tube, the non-target components
20 introduced into the third holding section by rotation around the first axis of rotation, and holding the non-target components during rotation around the second axis of rotation.

13. The measuring chip according to Claim 12, wherein the distance between a portion connecting the bypass tube to the first tube and the first axis of rotation is smaller than
25 the distance between a portion connecting the bypass tube to the second tube and the first axis of rotation.

14. The measuring chip according to Claim 12, wherein the bypass tube and the connecting portion of the second tube form an angle of less than 90 degrees.

5 15. The measuring chip according to Claim 1, wherein the measuring section has a measuring section connection tube that connects the centrifugal separation tube to the measuring section; and

an extension line of the measuring section connecting tube intersects the second axis of rotation.

10 16. The measuring chip according to Claim 1, wherein the measuring section further comprises a measuring section main unit that measures the target component introduced from the centrifugal separation tube by rotation around the second axis of rotation; and

15 the structure is formed in the measuring section main unit.

17. The measuring chip according to Claim 1, further comprising a regulation tube connected to the centrifugal separation tube and the measuring section, the regulation tube regulating the amount of sample centrifugally separated with the centrifugal separation tube.

20 18. The measuring chip according to Claim 17, wherein the regulation tube has a first point and a second point in the interior thereof; and

the distance between the first point and the first axis of rotation is smaller than the distance between the second point and the first axis of rotation.

25 19. A measuring chip for separating and measuring a target component in a

sample by rotation around a first axis and a second axis of rotation, comprising:

a centrifugal separation tube for centrifugally separating the target component from the sample by rotating the measuring chip around the first axis of rotation;

a first holding section provided in the bottom of the centrifugal separation tube,

5 wherein non-target components in the sample are introduced therein by rotation around the first axis of rotation, and the first holding section holding the non-target components during rotation around the second axis of rotation; and

a plurality of measuring sections that measure the target component introduced from the centrifugal separation tube by rotation around the second axis of rotation;

10 wherein a first stage measuring section amongst the plurality of measuring sections is connected with one end of the centrifugal separation tube, a measuring section after the first stage measuring section is connected to the preceding stage measuring section so as to introduce the target component into the following stage measuring section from the preceding stage measuring section, and the volume of the following stage measuring section is smaller
15 than the volume of the preceding stage measuring section.

20. The measuring chip according to Claim 19, wherein the measuring chip further comprises removing tubes connected to each of the measuring sections; and

20 each extension line of each of the removing tubes intersects with the first axis of rotation.

21. The measuring chip according to Claim 19, wherein the first stage measuring section has a measuring section connecting tube that connects the centrifugal separation tube and the measuring section;

25 each of the measuring sections after the following stage measuring section has a measuring section connecting tube that connects the preceding stage measuring section and the

following stage measuring section; and

an extension line of the measuring section connecting tube of the first stage measuring section and extension lines of each of the measuring section connecting tubes of the measuring sections after the following stage measuring section intersect at the second axis of rotation.

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22. A test chip for determining a target component in a sample by rotation around a first axis and a second axis of rotation, comprising:

a centrifugal separation tube that centrifugally separates the target component from the sample by rotating the measuring chip around the first axis of rotation;

10 a first holding section provided in the bottom of the centrifugal separation tube, wherein non-target components in the sample are introduced in the first holding section by rotation around the first axis rotation, and the first holding section holds the non-target components during rotation around the second axis of rotation;

15 a measuring section connected to one end of the centrifugal separation tube that measures the target components introduced from the centrifugal separation tube by rotation around the second axis of rotation;

at least one reagent reservoir that stores a reagent therein;

20 a mixing section connected with the reagent reservoir and the measuring section, the mixing section mixing the target component introduced from the measuring section by means of another rotation around the first axis of rotation, with the reagent introduced from the reagent reservoir by rotation around the first axis of rotation and/or the second axis of rotation;

a photodetection path connected to the mixing section, the photodetection path passing a mixed substance obtained by mixing the reagent and the target component;

25 a light inlet connected with the photodetection path, the light inlet introducing light into the photodetection path; and

a light outlet connected with the photodetection path, the light outlet removing light

after passing through the interior of the photodetection path.

23. A test chip for determining a target component in a sample by rotation around a first axis and a second axis of rotation, comprising:

- 5 a centrifugal separation tube that centrifugally separates the target component from the sample by rotating the measuring chip around the first axis of rotation;
 - a first holding section provided in the bottom of the centrifugal separation tube, wherein non-target components in the sample are introduced into the first holding section by rotation around the first axis rotation, and the first holding section holds the non-target
 - 10 components during rotation around the second axis of rotation; and
 - a plurality of determining sections that measure the target component introduced from the centrifugal separation tube by rotation around the second axis of rotation;
 - wherein each of the plurality of determining sections comprise:
 - a measuring section;
 - 15 at least one reagent reservoir that stores a reagent therein;
 - a mixing section connected with the reagent reservoir and the measuring section, the mixing section mixing the target component introduced from the measuring section by means of another rotation around the first axis of rotation, with the reagent introduced from the reagent reservoir by rotation around the first axis of rotation and/or on the second axis of
 - 20 rotation;
 - a photodetection path connected with the mixing section, the photodetection path passing a mixture of the reagent and the target component;
 - a light inlet connected with the photodetection path, the light inlet introducing light into the photodetection path; and
 - 25 a light outlet connected with the photodetection path, the light outlet removing the light after passing through the interior of the photodetection path;

wherein

a measuring section of a first stage determining section amongst the plurality of determining sections is connected with one end of the centrifugal separation tube;

5 a measuring section of a determining section after the first stage determining section is connected with a measuring section of a preceding stage determining section, so that the target component is introduced into the measuring section of the following stage determining section from the measuring section of the preceding stage determining section; and

the volume of the measuring section of the following stage determining section is smaller than the volume of the measuring section of the preceding stage determining section.

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24. The test chip according to Claim 23, wherein the test chip further comprises a removing tube that connects each of the measuring sections and each of the mixing sections of the determining sections, and each extension line of each of the removing tubes intersects with the first axis of rotation.

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25. The test chip according to Claim 23, wherein the measuring section of the first stage determining section has a measuring section connecting tube that connects the centrifugal separation tube with the measuring section of the determining section;

20 each of the measuring sections of the determining sections after the following stage has a measuring section connecting tube that connects the measuring section of the preceding stage determining section with the measuring section of the following stage determining section; and

25 an extension line of the measuring section connecting tube of the measuring section of the first stage determining section, and each extension line of each of the measuring section connecting tubes of the measuring sections of the determining sections after the following stage intersect with the second axis of rotation.

26. The test chip according to Claim 22 or 23, wherein the test chip further comprises a sampling needle connected with the centrifugal separation tube, the sampling needle serving to extract the sample.

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27. A method for using a chip in which a target component is introduced therein, comprising the steps of:

centrifugally separating the target component from a sample by rotation around a first axis of rotation, and holding non-target components; and

10 measuring the target component by rotating the chip around a second axis of rotation while holding the non-target components in an untreated state.

28. The method for using the chip according to Claim 27, wherein the chip has a reagent reservoir that stores a reagent, and a mixing section connected with the reagent
15 reservoir;

the method further comprising the steps of:

introducing the reagent into the mixing section from the reagent reservoir by rotation around the first axis of rotation and/or the second axis of rotation of the chip; and

20 mixing the target component with the reagent by rotating the chip around the first axis of rotation, and introducing the target component measured in the measuring step into the mixing section.